

What is claimed is:

1. A heat controller comprising:

a composite material comprising

5 a base material radiating a large amount of heat at a high-temperature phase, in combination with a phase-change substance having insulation properties at a high-temperature phase, having metallic properties at a low-temperature phase, radiating a large amount of heat at a high-temperature phase,  
10 radiating a small amount of heat at a low-temperature phase, and having a high reflectivity with respect to thermal infrared at a low-temperature phase,

said composite material controlling a temperature of an object.

15 2. A heat controller according to claim 1, wherein said phase-change substance comprises a thickness in the range from one to several tens microns, which being formed by either one of a coating method, a printing method with a thick film, a depositing method or the like.

20 3. A heat controller according to claim 1, wherein said base material comprises a thickness greater than a thickness of said phase-change substance.

4. A heat controller according to claim 1, wherein said phase-change substance is a perovskite oxide.

25 5. A heat controller according to claim 4, wherein said phase-change substance 1 is perovskite Mn oxide.

6. A heat controller according to claim 1, wherein said base material comprises a thickness in the range from 10 to 100 μm.

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7. A heat controller according to claim 1, wherein said base material being made of a material selected from a group consisting silicone, alumina, partially stabilized-zirconia, or the like and each possessing flexibility.

5 8. A heat controller according to claim 1, wherein a reflective plate or reflective film each having reflectivity with respect to visible light is laminated onto said phase-change substance on a side opposite from a side on which said base material is laminated.

10 9. A heat controller according to claim 1, wherein said composite material is affixed to a surface of an object which generating heat, either directly or via an intervening heat-conductive substance.

15 10. A heat controller according to claim 9, wherein said composite material is thermally joined to said object, via an appropriate intervening adhesive.

11. A heat controller according to claim 1, wherein said object comprises a non-flat surface.

20 12. A heat controller according to claim 1, wherein said object includes an electric or electronic circuit used in a space vehicle, including a man-made satellite and a spaceship.

25 13. A method for controlling heat, whereby a composite material formed by combining a base material radiating a large amount of heat at a high-temperature phase with a phase-change substance having insulation properties at a high-temperature phase, having metallic properties at a low-temperature phase, radiating a large amount of heat at a high-temperature phase, radiating a small amount of heat at a low-temperature phase,

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and having a high reflectivity in the thermal infrared region at a low-temperature phase is mounted either directly or indirectly to an object, so as to control the temperature thereof.

5 14. A method for controlling heat according to claim 13, wherein said base material comprises a thickness greater than a thickness of said phase-change substance.

15. A method for controlling heat according to claim 13, wherein said phase-change substance is a perovskite oxide.

10 16. A method for controlling heat according to claim 15, wherein said phase-change substance is perovskite Mn oxide.

17. A method for controlling heat according to claim 13, wherein said base material being made of a material selected from a group consisting silicone, alumina, partially stabilized-zirconia or the like, and each possessing flexibility.

18. A method for controlling heat according to claim 13, wherein either one of a reflective plate and a reflective film having reflectivity with respect to visible light is laminated onto said phase-change substance on a side opposite from a side on which said base material is laminated.

19. A method for controlling heat according to claim 13, wherein said composite material is affixed to a surface of a heat-generating object, either directly or via an intervening heat-conductive substance.

20. A method for controlling heat according to claim 13, wherein said object includes an electric or electronic circuit used in a space vehicle, including a man-made satellite and a spaceship.

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